in Zygnema, these are colored dark blue. Methyl-violet, dahlia and mauvein color the protoplasm and nucleus, and are specially valuable in the study of the latter. In some cases they are also precipitated in the cell-sap. Chrysoidin appears to color only the protoplasm. The following are some of the objects that were used: root-hairs of Trianea Bogatensis, Cucurbita, Tradescantia zebrina; stamen-hairs of various species of Tradescantia; Spirogyra spp., Zygnema spp.; roots of Lemna minor; leaves of Elodea (Anacharis) Canadensis, Vallisneria spiralis; pollen-tubes of Hemerocallis spp., Tradescantia Virginica, Scilla spp.; spermatozoids of Chara.

The objects are placed in a solution varying from .002 % to .001 %, varying with the nature of the cell-wall and the time of immersion. Root-hairs are usually especially delicate, and the solution should be very dilute or the immersion very brief.

In most cases objects were selected where there was marked protoplasmic streaming, as this is the best means of determining whether the cell is alive or not. It is surprising how deeply the protoplasm or nucleus may be stained without materially affecting the streaming. For a demonstration of the staining of the protoplasm the root-hairs of Trianea were found to be specially favorable on account of their large size and the rapid streaming, as well as the readiness with which the color is absorbed.—DOUGLAS H. CAMPBELL, *Tübingen.*

**H. W. Ravenel.**—Henry William Ravenel died at Aiken, S. C., July 17th. This is indeed sad news to all American botanists, for among their number there was none more respected and beloved and few whose scientific work covered so long a period. He was born in the parish of St. John's, Berkley, S. C., May 19, 1814. After receiving the usual high school training he entered the South Carolina College, and graduated with distinction in 1832. He then became a planter, and resided at St. John's for twenty years. In 1835 he was married to Miss Elizabeth Gilliard Snowden, of St. John's. His wife died in 1855, leaving a family of six children, four of whom still survive. In 1858 he married Miss Mary Huger Dawson, of Charleston, who, with five children, all daughters, survives to mourn their irreparable loss. In 1853 he removed to Aiken, S. C., where the remaining years of his life were spent. Although an active worker until the close of his life, when he suffered from a long illness following an attack of apoplexy, he was, unfortunately, for many years, afflicted with a deafness which was, at last, so great that he could hardly converse with strangers.

Mr. Ravenel was born with a fondness for natural history, and he pursued his studies in botany with enthusiasm during the whole of his long life. As a young man he explored minutely the region about St. John's, and he was equally active after his removal to Aiken. There was not a group of plants, no matter how small, which escaped his observation.

It is doubtful whether any other American botanist has ever covered so wide a range of plants. He not only studied critically the phænogams of South Carolina, but he collected and studied, as far as it was possible at that time and in a region remote from large libraries, mosses, lichens, algæ and fungi. But he was not an ordinary collector, heaping up rough material to be exchanged for specimens to be counted rather than studied. He was a most accurate observer, and always noted the habits and peculiarities of what he collected. He discovered a surprisingly large number of new species of cryptogams, besides a few new phænogams. Probably no person had so complete a knowledge of the cryptogamic flora of the southern states as he, and, for a long time, he and his friend, the late Rev. M. A. Curtis, of North Carolina, were practically the only Americans who knew specifically the fungi of the United States. Their interest in fungi brought them into correspondence with Berkeley, Montague, Fries and other leading mycologists of Europe of that time, and the name of Ravenel became well known abroad as well as at home.

His deafness made it impossible for him to accept any position which involved class instruction, and he was too modest to seek public preferment. The only occasion on which he accepted a government appointment was in 1869, when he was appointed botanist to the commission which, under Prof. Gamgee, was sent to Texas to investigate the cattle disease, and on his return he published a short report on the fungi of that state. At one time he was the agricultural editor of the *Weekly News and Courier*, and at the time of his death he held the position of botanist to the department of agriculture of South Carolina. He was an honorary member of a number of scientific societies of this country and Europe, and in 1886 the degree of LL. D. was conferred on him by the University of North Carolina.

As a writer, he was not voluminous, but the appended list of his works includes several valuable papers. They all show thoroughness and an active mind which went beyond mere descriptions and inquired into causes as well as results. The best known of his works is the "Fungi Caroliniani Exsiccati," in five volumes, the first of which appeared in 1853, and the last in 1860. This is the first published series of named specimens of American fungi of which only thirty copies were issued. Probably he intended to continue the work, but the breaking out of the war and the unsettled state of affairs which followed made it impossible to continue the series. At a later period he issued a second series in connection with the English mycologist, M. C. Cooke, under the title "Fungi Americani Exsiccati," of which eight centuries appeared from 1878 to 1882. The species of this second series were collected principally in South Carolina, Georgia and Texas. Apart from the publications which bear his name, if we would correctly estimate his contributions to American botany, we must also include the very numerous notes

and comments furnished by him to other writers, through whose pages they are scattered, a monument to his liberality and freedom from professional jealousy as well as to his industry and acuteness.

The name of Ravenel will be perpetuated in the genus Ravenelia of the Uredineæ, a genus so peculiar in its character that it is not probable that it will ever be reduced to a synonym. There are also many species of cryptogams named in honor of him as their discoverer. To those who have ever known him as a friend or correspondent, nothing is needful to keep his memory ever fresh. A devoted husband and father, a citizen whose life was full of kindness to all about him, a correspondent whose letters, overflowing with friendly feeling as well as information, were always a pleasure, a botanist inspired by a true love of nature and always guided by the spirit of investigation, we might call his loss irreparable had he not bequeathed to us an example of what a botanist should be. He was one of the pioneers of cryptogamic botany in this country. May those who follow be guided by the same spirit.

The following list includes all the works of Mr. Ravenel on botanical subjects as far as at present informed:

An enumeration of some few phænogamous plants, not heretofore published as inhabiting South Carolina, found in the vicinity of the Santee canal. *Charleston Medical Journal and Review*, iv, 32–38, 1849.

Contributions to the cryptogamic botany of South Carolina. *Charleston Med. Jour. and Rev.*, iv, 428–433, July, 1849, Mosses and Hepatics; v, 324–327, May, 1850, Lichens; vi, 190–199, March, 1851, Fungi.

A catalogue of the natural orders of plants inhabiting the vicinity of the Santee canal, S. C., as represented by genera and species, with observations on the meteorological and topographical conditions of that section of country. *Proc. Am. Ass. Adv. Sci.*, 1850, pp. 2–17.

Description of a new Baptisia found near Aiken, S. C. *Proc. Elliott Soc. Nat. Hist.*, i, 38–39, plate 2, 1859.

Notice of some new and rare phænogamous plants found in South Carolina. *Proc. Elliott Soc. Nat. Hist.*, i, 50–53, 1859.

Report on the fungi of Texas. In Report of Commissioner of Agriculture on diseases of cattle in the United States, pp. 171–174. Washington, 1871.

On the seemingly one-ranked leaves of Baptisia perfoliata. *Proc. Am. Ass. Adv. Sci.*, xx, 391–393, 1871; *Ann. Mag. Nat. Hist.*, ix, 174–175; *Jour. Bot.*, i, n. s., 84–85.

On the relation of the tendril to the phyllotaxis in certain cucurbitaceous plants. *Proc. Am. Ass. Adv. Sci.*, xx, 393–397, 1871.

Some rare southern plants. *Torrey Bull.*, vi, 81–82, March, 1876

Some more rare southern plants. *Torrey Bull.*, vi, 93–94, June, 1876.

Abnormal habit of Asclepias amplexicaulis. *Torrey Bull.*, viii, 87–88, Aug., 1881.

Gordonia pubescens. *Am. Nat.*, March, 1882, pp. 235–238.

The migration of weeds. *Torrey Bull.*, ix, 112–114, Sept., 1882.

Morphology in the tuber of Jerusalem artichoke. *Torrey Bull.*, x, 54–55, May, 1883.

Some North American botanists. Stephen Elliott. *Bot. Gaz.*, viii, 249–253, July, 1883.

A list of the more common native and naturalized plants of South Carolina. In South Carolina Resources and Population, Institutions and Industries. Published by the State Board of Agriculture. Pp. 312–359. Charleston, 1883.

Also, short notices in *Torrey Bulletin*, vi, 88; ix, 23, 128 and 140; xi, 132. A paper on edible mushrooms of this country read before the Aiken Vine-growing and Hort. Ass. about 1862–63; was printed in the Charleston newspapers of the day. W. G. FARLOW.

## EDITORIAL.

SINCE THE consolidation of the national surveys the government has done nothing for botanical exploration. Millions have been spent in increasing our knowledge of the other riches of our domain, but the plants have been left to private enterprise. It has been claimed that the botanical exploration of this country has been well-nigh completed, but that can only be said by those ignorant of the facts. What botanist does not know that a collector in a single season's work still brings back with him his harvest of new species and increased knowledge of the old? Hundreds of new species are being described yearly in this country. A single contribution, now on our table, describes 160 new species. In the face of all this wealth of undiscovered material, in view of the fact that geology, anthropology, etc., are receiving abundant aid, why does botany lack the fostering care of government appropriation? Money is appropriated for economic botany, but our plea is for the botany of North America. There are many localities not reached by collectors, or reached at such expense of time and labor that but scanty collections are made. The country is settled enough, and botanical interest is so diffused, that exploration could be well parceled out and thoroughly done. The old days of government exploration, when the botanist was compelled to keep pace with a constantly moving pack train, and snatch what he could in his hasty march, are passed, and regions can now be "worked up" in a thoroughly systematic way. The congressional committees on agriculture should be besieged by the botanists of this country to grant an appropriation for botanical exploration, to be under the direction of the already appointed botanical agency, the Department of Agriculture. The herbarium of that department should be enriched by the results of such exploration, until the North American flora is completely represented in our national collection. Such a provision would not only enrich the herbarium of the Department of Agriculture, but all of our larger herbaria, where North American plants are being critically studied. The good feeling of American botanists is such that the possessions of one are the common property of all. Collectors should be sent to unknown or difficult localities to work throughout the season; local botanists in interesting